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ABSTRACT

The goal of this paper is to demonstrate how Constructivism in education has failed to address criticisms by re-directing or misdirecting the focus of the debate over whether or not Constructivism is able to give support to a viable theory of instruction. In response, support is given to Constructivism by drawing on rational, moral, and communicative frameworks to clarify the main Constructivist tenets and to address levied criticisms. The discussion yields positive support for the possibility of supporting a Constructivist Theory of Learning and Instruction without adopting a Postmodernist stance. The following conclusions are drawn: (1) a close theoretical-practical connection is assumed to be a defining element of Constructivist Theory and can be given support independent of a Postmodernist framework by appealing to a broader notion of rationality that is objectively grounded and co-extensive with the prescriptive idealization of education, and (2) a theoretical exploration of practical cognitive and non-cognitive tools reveals a connection between these tools with prescriptive elements valuable to Constructivism and evolving education. The recommendation is made that, depending on how they are used, objective standards of learning and evaluation are not problematic for Constructivist instruction. (Contains 55 references.) (Author/AEF)

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In Support of Constructivism:Utilizing Rational, Moral and Communicative Frameworks to Address Frequently Posited Criticisms

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Abstract

The goal of this paper is to demonstrate how Constructivism in education has failed to address criticisms by re-directing or misdirecting the focus of the debate over whether or not Constructivism is able to give support to a viable theory of instruction. In response, support is given to Constructivism by drawing on rational, moral, and communicative frameworks to clarify the main Constructivist tenets and to address levied criticisms. From this, the recommendation is made that, depending on how they are used, objective standards of learning and evaluation are not problematic for Constructivist instruction.

Constructivism

Constructivism in Education originates with the basic assumption that reality (or its experience) is not separate from but includes participants (regardless of the nature of that participant) in its observations. The same constructs and mutual meaning are construed as a gradual process of accommodation that achieves a relative fit of meaning constructions.

Constructivism concentrates on contextually meaningful experience with the goal of fostering the development of autonomy and social reciprocity. Generally, Constructivism is considered to be a theory of knowledge and learning that concerns itself with what one knows and how it is that one comes to know. This theory derives its views on knowledge from multiple sources (i.e., philosophy, psychology, anthropology, sociology, etc) and considers knowledge to be internally constructed and socially mediated. Learning is viewed as a self-regulatory process involving individual meaning construction and processes of social negotiation through social activity, discourse, and debate (Twoney & Fosnot, 1996).

According to Constructivists, how one constructs knowledge is a function of the prior experiences, mental structures, and beliefs that one uses to interpret objects and events. Constructivism does not preclude the existence of external reality, it merely claims that each of us constructs our own reality of the external world. Thinking is grounded in perception of physical and social experiences, which can only be comprehended by the mind (Jonassen, 1991).

There have been many branches of Constructivist theories put forth. In contemporary Constructivist theory, the strongest individualistic theory of Constructivism comes from von Glaserfeld (von Glaserfeld, 1995; 1996). Von Glaserfeld's "Radical Constructivism" rejects the Objectivist notion that knowledge can be treated as an accurate representation of external things. In contrast the author emphasizes that knowledge be treated as an individual 'mapping of actions and conceptual operations that had proven viable in the knowing subject's experience' (von Glaserfeld, 1996). Under this view, no two people produce the same constructs and mutual meaning is construed as a gradual process of accommodation that achieves a relative fit of meaning constructions.

Spiro, R., Feltovitch, P., Jacobson, M., & Coulson, R. (1991b) offer a very selective version of individualistic Constructivist instruction drawing form their Cognitive Flexibility Theory (Spiro et al., 1987, 1988). This theory attempted to explain learning in ill-structured domains, highlighting the centrality of multiple knowledge representations:

> "Our Constructivist position, as it applies to complex and ill-structured domains, rejects any view that says either that there is no objective reality , or that there is an objective reality that can be captured in any single and absolute way. Rather, one of our principle tenets is that the phenomenon of ill-structured are best thought of as evincing multiple truths: single perspectives are not false , they are inadequate. That is why multiple knowledge representations are so central to Cognitive Flexibility Theory."

Spiro et al. (1992) refer to their general approach as 'Cognitive Flexibility Theory," taking it to be an integrated theory of learning, mental representation, and instruction that focuses on the acquisition of knowledge in ill-structured domains. This approach can be characterized as being critical (addressing deficiencies in learning) and involving multiple perspectives or representations of knowledge (multiple juxtapositions of instructional content).

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A second branch of contemporary Constructivism concentrates on the socially and culturally situated nature of learning activity, drawing much of its theoretical basis from Vygotsky (1970; 1979), social activity theorists (Bordieu, 1976; Garrison, 1998: Lave, 1998), Mead, and pragmatism (Rorty, 1978; Putnam, 1987). Garrisons (1996), Meadean approach to Constructivist epistemology emphasizes individual's self-realization being derived from actions in the social world. This view of Constructivism is largely embedded in a social context characterized by argument, discussion and debate. This is described by Cunningham (1991):

"At the heart of Constructivism is the notion that knowledge is constructed, which in the present instance means that our theoretical views are personal creations, embedded in a social context, within a social community that accepts the assumptions underlying the perspective. There is no right or wrong her in any absolute sense. Holding a theoretical perspective means, making a personal commitment to it, while recognizing the potential validity of other positions."

There are also approaches that attempt to combine both individualistic and social approaches to Constructivism. CTGV (1991) view of Constructivism can be described as combining elements of a individual and social learning perspective in an emphasis on the social nature of cognition. Under this view, the individual is free to build his or her own interpretations of the world, so long as the interpretation is coherent with the general zeitgeist. Knowledge is taken to be a dialectic process the essence of which is that individuals have opportunities to test their constructed ideas on others, persuade others of the virtues of their thinking and be persuaded, (CTGV, 1991).

Regardless of the Constructivist theory supported, there are certain fundamental characteristics of Constructivism that can be enumerated. First, there is a general agreement on Constructivists' rejection of the Objectivist framework, which assumes that there are established standards of teaching and evaluation that are known and can be imposed to control learning and assess learning performance. Constructivists oppose objectivity on two main points: (1) they oppose the external control of learning that is imposed independent of learning, and (2) they oppose Objectivists' justification of objective standards of evaluation based on claims of having objective knowledge of the real world. However, this does not mean that all forms of objectivity or objective standards of evaluation have to be rejected (as will be shown).

Second, there is a perceived necessary link between Constructivist instructional theory and practice. In, "Continuing the dialogue", Duffy and Jonassen (1991) hold that behind every good instructional design model there is a theory drawn from experience. They state that , "The models derived from those experiences do not simply reflect instructional strategies and methods--simple behavioral activities. They also reflect an underlying conceptualization of what it means to learn and to understand." What this does is establish a criterion that prevents any external control of learning, while at the same time not exclude theoretical concerns needed for there to be an instructional theory at all.

Many Constructivist authors believe that theories of learning and prescriptions for practice go hand in hand. Duffy and Jonassen (1991) state, "While instructional designers typically may not have the time or support to explicitly apply a theory of learning during a design or development task, the theory is nonetheless an integral part of the instruction that is produced." Thus, learning cannot be assessed on the basis of immediate task performance. Some aspects of learning are not required until much later. It is largely for this reason that there is an emphasis on higher-order learning.

It is also for this reason that there is an emphasis that learning environments should have real-world relevance and that students should be equiped with appropriate levels of complexity (authentic tasks). Learners should actively engage in building complex knowledge structures and this requires higher-order thinking (knowledge construction). Evaluations need to be able to assess higher order thinking well (Gagne, 1987; Merrill 1983). It is seen as more important to evaluate how learners construct knowledge (knowledge acquisition), rather than to evaluate the product (process oriented).

Third, there is a strong prescriptive component that marks a defining feature of the Constructivist approach (Bednar, Duffy, Cunningham, & Jonassen, 1991). This is reflected in how learning and learning assessments are considered to be a continuous, ongoing process, rather than being tied to a specific task performance (Jonassen, 1991, 1992, 1995). Also, Constructivist instruction is directed towards the cultivation and assessment of higher-level learning (Spiro, Feltovitch, Jacobson, & Coulson, 1991, 1992). The prescriptive aspect of Constructivist instruction is valuable because it includes within its approach the assumption that learning and instruction are evolving processes. This is highly supported by those educational scholars who believe in the importance of educational ideals (Searle, 1995; Steffe, 1995).

Objectivist and Constructivist responses to paridigmatic criticism

One pivotal methodological issue for Constructivist theory surrounds the question of how objective knowledge is tto be treated. Given that, terms like "objectivist" and "objectivity" have been used in a multiplicity of ways, it must be clarified how these terms are been employed in the present work.

The present discussion utilizes the general notion of objectivity as the objective view of knowledge derived from general philosophy. The objective view of knowledge asserts that there is a real and structured world for which one can possess reliable knowledge (Putnam, 1994; Reigeluth, 1991). Knowledge obtained from the world is taken as stable and reliable because properties of objects in the world from which knowledge is obtained are assumed to be relatively unchanging. Because knowledge is objective, the meaningfulness of knowledge is external to individuals and therefore can be analyzed and standardized.

The first criticism from Objectivists opposes Constructivist's failure to take pre-existing skills and individual performance outcomes into consideration, based on their evaluation of success being represented by the completion of the learning task (Dick, 1991). Jonassen (1995) discusses the implications of Constructivism for learning and instruction:

> "The principles by which those learning environments may be built focus on four general system attributes: context, construction, collaboration, and conversation. Constructivist environments engage learners in knowledge construction through collaborative activities that embed learning in a meaningful context and through reflection on what has been conversation with other learners ."

Many of the fundamental attributes considered by Constructivist instruction do not start in learning that begins in the discrete learning situation to be considered. Rather, they have been built from previous experience (Dick, 1991; Reigeluth, 1991). According to Objectivists, such attributes as pre-existing knowledge cannot be dismissed. They are a part of, and presupposed by, any Constructivist instruction. There exists some standards due to previous experience, without which, new learning would be inconceivable (Searle, 1981, 1992). Such standards are brought into new learning situations in the form of previous knowledge and skills that have been built through past experience. In the Objectivist view, ignoring this is a serious oversight that plagues Constructivism in education.

A second criticism from Objectivists concerns the Constructivist challenge of assessing learning. If Constructivists do not use performance as an assessment of learning, then how does one know if learning has taken place? Some Constructivists posit that learning is an emergent property, invoking both instructors and participants, that "falls out" of the learning process (Bednar, Cunningham, Duffy, & Perry, 1991; Cobb, 1994; Cobb & Yackel, 1996; Jonassen, 1991). Cobb (1996) argues that researchers have to be included as well due to their interpretive role and perspective in the educational context. Cobb further states that it is social reality that should dictate the theoretical perspective. The author draws on previous classroom research (Cobb & Yackel, 1994) that utilized ongoing student-instructor interactions in conjunction with an inquiry-based instruction and that yielded positive support for learning mathematics. Emergent learning explanations, similar in nature to Cobb's (1996) are becoming increasingly popular as well (Bereiter, 1994; Martin & Sugarman, 1996; Perkins, 1993; Prawat, 1996).

For some, these types of learning explanations are not sufficient. Reigeluth (1991) supports there being a need for some sort of objectivity in contextual performative evaluation. He accounts for the fundamental difference in approach to learning assessment by the fact that these other authors chose to connect instructional theory with learning theory, whereas he treats them as different and maintains the need for there to be a separation.

Unfortunately, the Constructivists' responses do not sufficiently address the above levied criticisms. Most responses do not acknowledge the specific questions, but merely attempt to oppose the Objectivist framework (Bednar, Cunningham, Duffy, & Perry, 1991, Jonassen, 1991, 1994, 1997). Jonassen, Hennon, Ondrusek, Samouilova, and Spaulding (1997) provide opposition to the Objectivist approach to science by utilizing work from hermeneutics (knowledge building through interpretation), fuzzy logic (evaluating from multiple sources and perspectives based on probabilistic and non-linear nature of information), and chaos theory (emphasizing non-predictable nature inherent in systems). Stronger Constructivist responses seek to reject completely the criticisms levied, but more moderate Constructivist responses seek to assimilate other perspectives into their own framework (Cunningham, 1991, 1992). Within this view, objectivity becomes translated into another perspective that can be subsumed and exercised without contradicting other perspectives. This multiple perspectives approach emphasizes the importance of integrating all views in the evaluation process (Jonassen, 1991). By not acknowledging specific questions and by redirecting the focus of existing criticisms made, Constructivist explanations do not address the issues, but merely evade them.

Towards an alternative view of Constructivism

For the most part, Constructivist explanations share a common theoretical grounding in Postmodernist philosophy (Phillips, 1995, 1996; Prawat, 1996). Postmodernist philosophy can be characterized by the breaking of all ties with existing foundational modes of thought and replacing this structure with a relativistic philosophy that embraces multiple frameworks of meaning found in particularistic accounts, (Guba & Lincoln, 1985; Howe, 1988;

Rorty, 1986). Guba and Lincoln (1985) believe there to be no possibility of accomodation between the foundational scientific and Postmodernist paradigms because the basic assumptions of the two are in conflict.

Adherance to a Postmodernist framework is an implicit assumption that runs through numerous Constructivist theories, such as von Glaserfeld's (1990) "radical Constructivism" and the majority of social Constructivist work (Cunningham, 1991, 1992; von Glaserfeld, 1990). Radical Constructivism (1990) holds that there is no objective reality that can be uniformly interpreted by all , while Cunningham's (1991) Social Constructivism calls for the integration of multiple perspective taking to accommodate individuals' differing interpretations. Much of the criticism of Constructivism (Reigeluth, 1991; Dick, 1991) is directed at the lack of objective standards and means of rational legitimization entailed by adopting Postmodernist philosophy.

There are alternatives to Postmodernist philosophy that allow for multiple frameworks of meaning, which characterize Constructivist explanations. Putnam (1990) argues for the possibility of appealing to objective rational standards by demonstrating the need for particular communities and practices to rely on some level of underlying conditions required for evaluative judgements to be made in the Constructivist domain or any other domain. This demonstrates the potential of Constructivism to overcome certain limitations that have been pointed out (Dick, 1991; Reigeluth, 1991).

A more comprehensive view of Constructist instruction can be obtained by examining the cognitive tools available (Kommers, Jonassen, & Mayes, 1992) within a non-Postmodernist perspective (Putnum, 1990; Siegal, 1996). Attempting to theoretically ground cognitive and non-cognitive tools relevant to the Constructivist position will provide a more extensive view essential to providing any serious support to the Constructivist position.

Addressing criticisms to Constructivism by drawing on multiple frameworks

This section deals with criticisms to Constructivism by presenting evidence from areas outside the literature. The literatures drawn from provide innovative ways to defend Constructivism, referred to as tools. These tools are divided in cognitive and non-cognitive types. Cognitive tools refer to individual psychological processes, whereas, non-cognitive tools refer to broader normative acts such as discourse practices.

Theoretically grounding cognitive tools in support of Constructivism

In *Rationality Redeemed?*, Siegel (1996) introduces his theory as a continuation of longstanding efforts to demonstrate that rationality possesses an "educational cognate" in critical thinking (Barnes, 1992), which represents an educational ideal. This work stems partly from an effort to address anti-Enlightenment tenets present in philosophy of education. It acts as both a response to existing arguments and as a further development of the Siegel's rationalist thesis.

The main tenet of the thesis is that the ideal of education is to promote rationality and critical thinking. This rationality is broad, involving both epistemological and moral dimensions. Siegel (1996) defends the critical thinker as someone who possesses specific characteristics:

> "A critical thinker must have, then both a solid understanding of the principles of reason assessment, and significant ability to utilize that understanding in order to evaluate properly beliefs, actions, judgements, and the reason which are thought to support them. This dimension of critical thinking may be called the reason assessment component of critical thinking."

Following this, Siegel outlines two principles of reason assessment: general (applicable to many domains) and subject-specific (domain specific). Grasping these principles is considered to be an important part of critical thinking. Ultimately, Siegal supports that critical thinking is an educational ideal characterized by the following attributes: respect for students as persons, self-sufficiency and preparation for adulthood, initiation into the rational tradition, and democratic living. This educational ideal is, therefore, also a moral ideal. Thus, although critical thinking links directly with epistemology, it involves other dimensions as well when it is considered an educational ideal. It is also for this reason that Siegal believes it is important for philosophy and philosophy of education to engage in discourse.

This broad notion of rationality has not only an epistemological dimension, but also a moral dimension. For this reason, a large range of cognitive tools can be congruent with Constructivism's prescriptive component, concerned with learning activity that includes individuals' attitudes (moral).

Another important cognitive tool for Constructivist instruction is the imagaination. Imagination is a cognitive tool that represents Constructivist instruction as a higher order learning skill. Egan (1992) provides a very useful aid in shedding light on a powerful cognitive tool that contributes greatly to learning. This is important to the present discussion on Constructivism as a means of pointing to cognitive capacity often overlooked by instructional theories but essential to Constructivist instruction. Egan incorporates the cognitive tool of imagination into educational practices.

Egan (1992) argues for the necessity of imagination to be incorporated in education. He attempts to carry his concept of 'imagination' into discussions of conventional thinking, emphasizing the need for freedom of mental activity:

> "Imagination is what enables this transcendence, and is consequently necessary to education. It is important because transcending the conventional is necessary to constructing one's sense of any area of knowledge: accepting conventional representations is to fail to make knowledge one's own. It is to keep it inert rather than incorporate it in one's life."

Egan remarks on the tension that exists between conventions and imagination, marking it as a problem that has to be worked out. Also, Egan distinguishes the way in which humans learn from the ways computers operate in order to demonstrate that learning is not simply a question of recording symbols for later retrieval:

> "If we allow our technologies to determine how we think about our intellectual processes, then one effect, which has been pervasive and very damaging to education, is to think of learning as a process analogous to recording symbols in the mind for later retrieval."

Here, Egan is attempting to draw attention to the fact that the meaningfulness of learning requires a more flexible approach. He (1992) states, "The more flexibly we can think of things as possibly being so, the richer, and more unusual and effective can be the meaning we compose." Thus, memorization of knowledge only is simply not enough. However, the memory is considered to be important to the imagination, since it is that which is contained in one's memories that the imagination draws on with which to construct.

The above discussion on imagination builds on the discussion of cognitive elements, giving attention to a cognitive tool that has been neglected in the literature. In addition, the discussion on imagination makes an appeal to non-relativistic standards that extend beyond the practical instruction, transcending conventions. This gives a prescriptive element into educational practices that Constructivist instruction encourages.

Theoretically grounding non-cognitive tools in support of Constructivism

Recent innovative Constructivist research in the area of moral and cooperative learning has contributed to extending what is understood to represent Constructivism's theoretical grounding (DeVries, Reese-Learned, & Morgan, 1991; DeVries & Zan , 1996). This work has demonstrated that Epistemology is an element of the whole of Constructivist philosophy, which is dynamic, including not only descriptive but prescriptive elements. That is, it is not only about what is but also what could be. This is an important attribute of Constructivism that has been largely neglected.

The presence of broad treatments, such as Larochelle and Bednarz's (1998), suggests that the foundation of Constructivism cannot be exhausted by epistemological legitimization. There are also needs for cooperation and discourse, which have moral as well as epistemological conditions. Sensitivity to these non-cognitive tools is required for Constructivist instruction be initiated (Jonassen, 1994).

The moral dimension of Constructivism has received little attention in the contemporary Constructivist literature. However the need to consider moral dimensions of Constructivism is a pressing task (Piaget, 1965; 1981). Piaget (1965) argued against the Objectivist approach to education where instructors controlled all aspects of student learning. In drawing from his own work, he observed that such a control over learning resulted in mindless moral and intellectual conformity, leading to self-doubt, lack of curiosity, uncritical thinking, and problems in cooperative interactions. DeVries and Zan (1996) support a sociomoral theory of Constructivism aimed at encouraging cooperative sociomoral development. The authors believe that such considerations are necessary in order to prevent the loss of individual knowledge constructions and self-regulatory learning.

Attention is directed at promoting multiple perspective taking and moral reasoning among children to encourage greater interpersonal understandings. This perspective draws on previous research (DeVries, Reese-Learned, & Morgan, 1991), which found that children subjected to a Constructivist classroom setting invested greater effort to resolve interpersonal conflicts compared to children subjected to eclectic or didactic oriented kindergarten classroom settings. From this work, Devies & Zan (1996) support that rule and decision making should be directed, promoting feelings of necessity and fairness in rule making, a sense of commitment and ownership in decision making, and a sense of shared responsibility in how the group gets along. The result of this is believed by the authors to encourage mutual respect among learning. From this they conclude that a moral classroom contributes general conditions for intellectual development.

How can broadening Constructivism to include moral attributes aid in dealing with posited criticisms? First, on a theoretical level, it contributes to the understanding of Constructivist Instruction as not only descriptive but prescriptive as well. This builds on the discussion of cognitive tools by tying the prescriptive value of Constructivism to actual Constructivist research. On a practical level, it extends knowledge of Constructivism's

breadth with respect to learning content. It demonstrates that Constructivism is not only limited to epistemological constructions but also includes moral constructions. More importantly, this work brings to the surface an important aspect of Constructivism that has never been actually pursued but only speculated on by Bednar, Cunningham, Duffy, and Perry (1991):

> "Optimally, we would tie our prescriptions for learning to a specific theoretical position--the prescriptions would be a realization of a particular understanding of how people learn. Minimally, we must be aware of the epistemological underpinnings of our instructional design and we must be aware of the consequences of that epistemology on our goals for instruction, our design of instruction, and on the very process of design."

In addition, there is something extremely important to recognize when assuming a theoretical-practical connection that has not been addressed in the Constructivist literature. This is perhaps one of the most powerful Constructivist tools that has yet to be discovered. Given that there is an assumed theoretical-practical connection at the heart of all Constructivist inquiry (Bednar, 1991; Cunningham, 1991; Jonassen, 1991), any extension of Constructivist practices (e.g., moral and cooperative learning) also assumes a theoretical connection beyond other knowledge constructions acquired in experience. In this way, the theory of Constructivism is itself a meta-construction or meta-cognition. This is similar to Siegal's (1996) argument against Postmodernism.

One way to bind these cooperative and communicative practices to a theoretical grounding that supports both morality and rationality has been posed by Habermas (1990; 1993). Habermas advocates a communicative theory of meaning where claims of validity and truth are decided by resolving normative rightness, which can be determined through discursive argumentation. He summarizes the generalized moral imperative that corresponds to his theory of argumentative discourse. He states that, "All affected can accept the consequences and the side effects its general observance can be anticipated to have for the satisfaction of everyone's interests (and these consequences are preferred to those of known alternative possibilities for regulation)."

Habermas makes a concerted effort to bridge the gap between appeals for the communal shaping of values/practices with the autonomous role of the rational individual. For Habermas, moral practices are social matters to be decided by discourse interactions of individually deliberating subjects. Thus, both individual will and community practices are taken into consideration by Habermas' (1990) universal theory of argumentative discourse.

The importance this has for Constructivism is threefold: (1) it provides a means of making a theoretical-practical bridging generally assumed within the Constructivist domain, (2) it provides a connection between rationality and morality, and (3) it provides a means of connecting the individual and collective group.

Habermas' work could be used to support the Constructivist Theory of Learning and Instruction against Objectivist criticisms. Much of the criticisms surrounding Constructivism are directed at the inability to have any objective standards (Reigeluth, 1991). However, the theoretical grounding provided above with Habermas' Kantian project (1990) offers certain objective standards. Kant (1787) believed that the only genuine morality is one that would be objectively and universally binding. It would apply to all people and be the same for all. The basis of this morality that applied to all resided in rational nature. For Kant, it was rational nature that provided the binding force in which to ground morality. In his "Critique of Practical Reason" (1787), Kant defines "practical principles" and discusses their moral implications. Kant also states that, "Practical principles are propositions which contain a general determination of the will, having under it several practical rules. They are subjective, or practical laws, when the condition is recognized as objective, i.e., as valid for the will of every rational being."

This notion of objectivity is not the same as that to which Constructivism is opposed. The brand of objectivity that Constructivism opposes claims that knowledge representations correspond to the external world and that externally imposed standards based on this knowledge can be used to control teaching. This brand of objectivity controls the learner and prevents learning to be constructed. This is very different from the brand of objectivity discussed by Kant (1781), which does not claim objective knowledge of the external world at all.

Instead it assumes only objectivity that corresponds to the individuals' shared rational nature. It is not an externally imposed standard to control learning, but rather, represents an integral characteristic of each individual to be constructed in practical experience with others. What makes this limited brand of objectivity so attractive is that it allows for objective standards to be pursued as an essential part Constructivist Instruction. At the same time, it does not enforce any objective standards that would control learning. This is overcome by viewing objective standards as prescriptive standards to be progressed toward but never fully obtained. This form of objectivity as a rational standard is substantiated by the efforts throughout the paper to demonstrate the prescriptive components of Constructivist Instruction entailed by Constructivism's theoretical-practical assumption.

How does this contribute to the problem of learning assessments? How does an objective rational grounding address standards of evaluation required for effective instruction? The contribution made lies in how it is that standardized evaluative measures essential to instruction are treated. Under this view, problems of

evaluation are resolved by Constructivist instructions' prescriptive function. First, evaluations would not simply be administered but would be integrated as part of the learning process. This could be accomplished by making clear who is responsible for creating the evaluative standards and when. This way students can feel they are not merely subjected to some imposed standard, but rather are participating in the standard evaluation. This is done so that students can learn to understand the standard as a first step in being able to participate in the evaluation and selection of future standards. This can be taken to be a type of cognitive apprenticeship (Clancy, 1992; Cobb, 1996; Collins,1991).

Second, learners are participating in standard evaluations administered not with the understanding that the standard is objectively true but rather, is a logical possibility, objectively true for all learning participants and to be worked towards in a cooperative manner (Habermas, 1995; Kagan, 1990). This captures the essence of what Constructivism should encourage when attempting to provide instruction in an educational setting.

Conclusion

The previous discussion yields positive support for the possibility of supporting a Constructivist Theory of Learning and Instruction without adopting a Postmodernist stance. The following conclusions are drawn: (1) a close theoretical-practical connection assumed to be a defining element of Constructivist Theory and can be given support independent of a Postmodernist framework by appealing to a broader notion of rationality that is objectively grounded and co-extensive with the prescriptive idealization of education, and (2) a theoretical exploration of practical cognitive and non-cognitive tools reveals a connection between these tools with prescriptive elements valuable to Constuctivism and evolving education.

The issue of objective standards within Constructivism is found not to be a problem as many critics purport. While Constructivist Instruction does not base itself on the thesis of objective realism, incorporating objective standards within Constructivist instruction without opposing its fundamental tenets is a challenge. Concentrating on the necessity of rationality and the prescriptive component of Constructivist Instruction have revealed promising objective standards in which to imbed Constructivism. This adds an important element to the existing Constructivist paradigm.

Supporting the necessity of rationality and the prescriptive component of education has revealed promising objective standards in which to imbed Constructivist Instruction. Future work should be concerned with determining the extent to which such objective standards are effective for Constructivist instruction.

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